ECE 460/365 HW 7

1. How many roots of the following polynomial are in the LHP, RHP and jω axis?

$$P(\Delta) = \Delta^5 + 2\Delta^4 + 2\Delta^3 + 4\Delta^2 + \Delta + 2$$

2. How many poles of the following function are in the LHP, RHP and jω axis?

$$T(\Delta) = \frac{\Delta^2 + 7\Delta + 10}{\Delta^6 + 2\Delta^4 - \Delta^2 - 2}$$

3. The closed-loop Transfer function of a system is

$$T(\Delta) = \frac{\Delta + 5}{\Delta^5 - \Delta^4 + 3\Delta^3 - 3\Delta^2 + 2\Delta - 1}$$

Determine how many poles are in the LHP, RHP & jω axis.

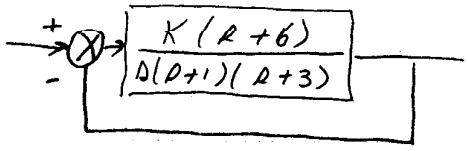
4. Repeat (3) for

$$T(\Delta) = \frac{\Delta^2 + 3\Delta - 4}{\Delta^4 + 4\Delta^3 + 5\Delta^2 + 8\Delta + 6}$$

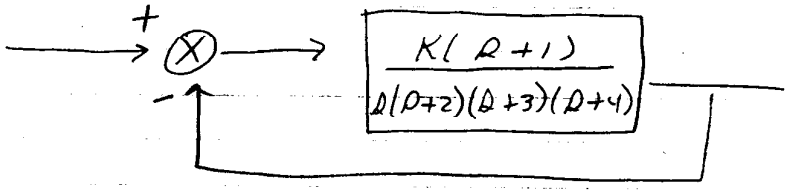
14. Consider the following routh table. Notice the Δ^5 row was originally all zeros. Tell how many poles are in the RHP, LHP & jω axis

s^7	1	2	-1	-2
s^6	1	2	-1	-2
s^5	3	4	-1	0
s^4	1	-1	-3	0
s^3	7	8	0	0
s^2	-15	-21	0	0
s^1	-9	0	0	0
s^0	-21	0	0	0

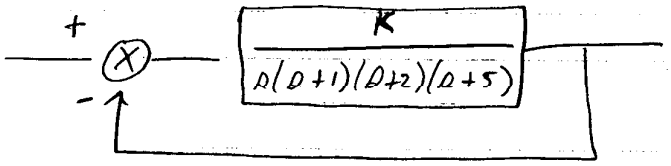
18. Determine the range of K for stability



19. Repeat (18) for



34. Consider the following system



(a) Find K for stability
(b) Find K for Marginal Stability
(c) Find the actual location of the closed loop poles when the system is marginally stable.